Addendum to the IEP Symposium abstracts
Wednesday March 30, 2011

Session 2: Changing Habitats and Food Webs
10:20 – 10:40 AM

How did I get here? Tinkering with Turbidity, Tides, and Twilight for Migrating Delta Smelt

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Year one of the Delta Smelt Turbidity Study involved monitoring turbidity (i.e. low water transparency) distributions and a large-scale field experiment targeting delta smelt responses to the "first-flush" of suspended sediment from the Sacramento River watershed. Numerous challenges arose while undertaking this adaptive field experiment with endangered species in the context of the interagency framework, which reflected a significant collaborative effort by several IEP agencies.
Turbidity distributions were monitored using a network of sensors recently deployed throughout the Delta. This winter's "first flush", which occurred in late December, raised turbidity levels little, and limited these increases to the north Delta despite relatively high river flows. In particular, turbidity associated with this "first flush" never reached Mallard Island on the south shore of Suisun Bay. Turbidities were also elevated by several wind events. Interestingly, wind-wave generated turbidities in the central Delta exceeded those associated with the first-flush.
Fish sampling occurred daily from December 21, 2010 to January 2, 2011, and addressed responses to first-flush turbidity and tidal current direction following results from the 2010 pilot study. Sampling alternated daily between two locations, one near Decker Island in the Sacramento River and another near Jersey Point in the San Joaquin River. At each location Kodiak trawls were conducted near the shoal-channel interface with beach (or purse) seines conducted concurrently along the shoreline over a complete tidal cycle (14-16hrs) each day. Zooplankton, hydrodynamics, and water quality variables also were monitored. Delta smelt were caught primarily in the Sacramento River where turbidity levels were slightly elevated and almost exclusively during flood tides by Kodiak trawls and on ebb tides by beach seines, suggesting delta smelt clearly respond to tidal current direction. Offshore movements during flood tides would facilitate migration upriver or maintaining position, whereas moving onshore during ebb tides would limit transport downriver. A detailed analysis of these results will provide guidance for next year's study and contribute to understanding of the delta smelt-turbidity relationship.

Poster session:

Longfin Smelt Growth Variability Before and During the Pelagic Organism Decline

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High frequency spatial sampling of phytoplankton and water quality was conducted to determine the patchiness of water quality and phytoplankton in the Sacramento and San Joaquin Rivers. Such information is needed to understand food resource availability in the Delta and how this may affect fishery production. Continuous measurement of water quality and high frequency measurements of phytoplankton community composition were conducted monthly along longitudinal transects in the Sacramento and San Joaquin rivers between April and October 2010. Water quality was measured using YSI 6600 water quality sondes and phytoplankton species were sampled at 6 min intervals using the FlowCAM digital imaging flow cytometer. Phytoplankton communities were dominated by cryptophytes most of the year and diatoms in May and were significantly different between rivers. Over 80% of the variation in the phytoplankton community was accounted for by diatoms and cryptophytes and the percentage of biomass among these phytoplankton groups was significantly correlated with water quality conditions. Time series analyses demonstrated communities and water quality conditions were patchy and varied seasonally.